Remarks

Claims 1-13 are pending. Applicants note that a preliminary amendment was filed on February 19, 2002, but (understandably) was not considered in the first office action. The amendments and support are discussed with greater specificity along with the applicable rejections. No new matter has been added.

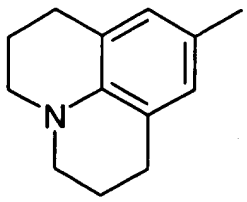
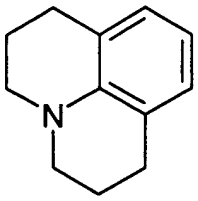
The Examiner objects to the abstract and provides a suggested amendment. Applicants amend the abstract as suggested.

The Examiner rejects claims 1-7 under 35 U.S.C. 112(2) as being indefinite. The Examiner notes that preferred ranges are considered indefinite under US practice. Each of the preferred elements has been deleted. One new dependent claim (claim 12) has been added directed to a preferred element.

The Examiner objects to the definitions for R_1 and R_2 on the grounds that it is unclear whether Ar_3 is a possible substituent. The definition of R_1 and R_2 is illustrated below with supplemental comments:

"... wherein **R_1** and **R_2**, independently from each other, stand for
C_1-C_{25}-alkyl,
allyl
which can be substituted one to three times with C_1-C_3alkyl or Ar_3 *(Ar_3 is a possible substitution of allyl),*
or **$-CR_3R_4-(CH_2)_m-Ar_3$** *(is a substituent for R_1 and R_2)*, wherein
R_3 and R_4 independently from each other stand for hydrogen, ~~or~~ C_1-C_4alkyl or phenyl *(is a substituent for R_3 and R_4)*, which can be substituted one to three times with C_1-C_3 alkyl, Ar_3 *(is a substituent of $-CR_3R_4-(CH_2)_m-Ar_3$)* stands for phenyl or 1- or 2-naphthyl which can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, halogen or phenyl, which can be substituted with C_1-C_8alkyl or C_1-C_8alkoxy one to three times, and m stands for 0, 1, 2, 3 or 4, ..."

Applicants submit that the definitions are clear and definite in light of the above comments.

The Examiner objects to claims 1 and 7 for including both the term "julodidyl" and a corresponding chemical structure. Julodidyl, which correctly is  , is derived from julolidine which is named 2,3,6,7-tetrahydro-1H,5H-benzo(ii)quinolizine according to Beilstein:  . The term is provided for clarification, while the corresponding chemical structure has been corrected.

The Examiner objects to claims 1 and 7 on the grounds that the definition for R_{10} is unclear. R_{10} stands for C_6-C_{24}-aryl or a saturated or unsaturated heterocyclic radical comprising five to seven ring atoms, wherein the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, or halogen.

The Examiner indicates that R_{11} is not used in the claims. Claims 1 and 7 have been amended to read "*R_8 and R_9 stand for -C(O)R_{10}, wherein R_{11} can be C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, R_{10}, -OR_{12} or -$NR_{13}R_{14}$, wherein R_{12}, R_{13}, and R_{14} stand for C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, C_6-C_{24}-aryl, ...*"

The Examiner is confused as to which substituent is being modified in the lines 7-10 from the end of claim 1. The text in the 10th through the 7th lines from the end of claim 1 and the corresponding passage in claim 7 pertains to R_5, R_6 and R_7.

The Examiner objects to claims 2-5 for improperly incorporating only a portion of a preceding claim. The applicable part of these claims has been incorporated into the base claims.

The Examiner notes that "in treating" is not grammatically correct. The claim has been amended to provide "comprising treating the DPP derivative of formula ..."

The Examiner objects to the phrase "an usual alkylating agent". The term "usual" has been deleted. The alkylating agent is a sulfonate, tosylate, mesylate, carbonate, sulfate, or halogen compound of the formula $(R_1)_{1 \text{ or } 2}X$, wherein X stands for SO_3-, (p-Me-phenyl)-SO_2-, (2,4,6-trimethyl-phenyl)SO_2-, -CO_3-, -SO_4-, or halogen, or a mixture of $(R_1)_{1 \text{ or } 2}X$ and $(R_2)_{1 \text{ or } 2}X$" to "and the alkylating agent is a compound of the formula R_1X or R_2X, wherein X stands for SO_3-, (p-Me-phenyl)-SO_3-, (2,4,6-trimethyl-phenyl)SO_3-, or halogen, $(R_1)_2X$ or $(R_2)_2X$, wherein X is -CO_3- or -SO_4-, or a mixture of $(R_1)_{1 \text{ or } 2}X$ and $(R_2)_{1 \text{ or } 2}X$.

The Examiner objects to the use of the terms "usually" and "generally". These terms have been eliminated from the claims.

The Examiner suggests inserting "or" before $R_8(O)_nSe\text{-}Se\text{-}(O)_nR_8$ in claim 3. Claim 3 has been amended accordingly.

The Examiner request clarification of step (a) in claim 3. The claim has been amended to allow for hydrogen substitution in order to conform to the reaction taught in the claims and specification.

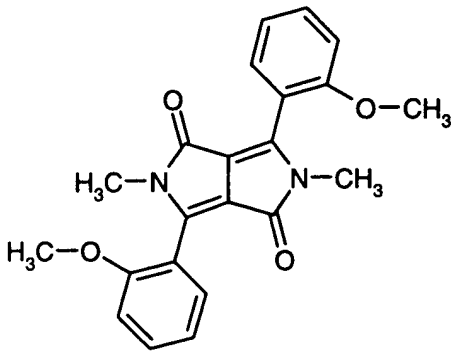
The Examiner objects to the phrase "in analogy to known methods in the art" in claim 4. The phrase has been deleted.

The Examiner notes that use of "materials" and "compounds" implies more than one in claim 4. Claim 4 has been amended to use the singular form.

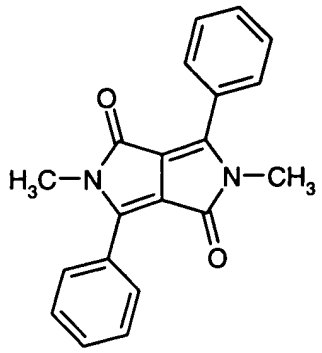
The Examiner notes that there is no antecedent basis for "colored high molecular weight organic material" in claim 5. Claim 5 has been amended to change "Composition" to "A colored high molecular weight organic material".

The Examiner objects to the use "high" as subjective. Applicants agree that the term is relative. However, it is well understood in this field as referring to polymeric materials. Particularly preferred polymeric materials are described in the Specification. Those skilled in the art will understand the metes and bounds of the claims despite the use of such a subjective term. General knowledge and a review of the Specification will be sufficient for a complete understanding of the intended subject matter.

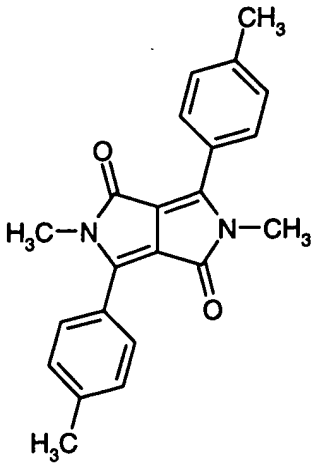
Applicants enclose a Declaration Under 1.132 by Yamamoto Hiroshi with comparisons against the closest state of the art. Comparative Compound C-1



is taken from example 1 in published European Patent application 499,011;
Comparative Compound C-2

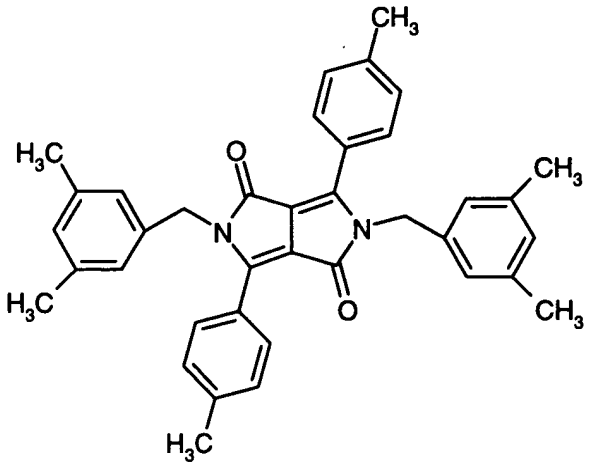


Is taken from example 7 in EP '011 and compound 2a from published DE 3,713,459;
Comparative Compound C-3



is taken from example 6 in published European Patent application 133,156.

Inventive Compound I-1



is shown in Example 19.

The Examiner rejects claims 2, 4, 5 and 7 under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. Nó. 4,585,878 ("Jost et al.") and DE 3713456 ("Langhals") (claim 7 only). The Examiner rejects claim 6 under 35 U.S.C. 103 as being unpatentable in view of Jost. Applicants respectfully traverse each of these rejections.

Claims 2, 4, 5 and 6 now depend from compound claim 7. Claim 7 is directed to novel fluorescent diketopyrrolepyrrole compounds of formula I or III. Claim 7 is limited to the preferred specific aromatic groups, while excluding the phenyl group from the definition of Ar_1 and Ar_2. The exemplified compounds of Jost and Langhals are substituted by phenyl in the positions corresponding to Ar_1 and Ar_2.

The Examiner rejects claims 1 and 4-7 under 35 U.S.C. 102(b) as being anticipated by published European patent application 499,011 ("EP '011"). Applicants respectfully traverse this rejection.

EP '011 claims an organic EL element comprising a DPP compound. An electroluminescent device is shown in examples 3 and 7 comprising an anode, a hole transporting layer, a light-emitting layer of 2,5-dimethyl-3,6-di(o-methoxyphenyl)pyrrolo[3,4-c]pyrrole (and polycarbonate in a 1:1 ratio) and 2,5-dimethyl-3,6-di(phenyl)pyrrolo[3,4-c]pyrrole, respectively and a cathode. 2,5-dimethyl-3,6-di(phenyl)pyrrolo[3,4-c]pyrrole does not show electroluminescence in thin film type organic EL devices. The emission from the device using 2,5-dimethyl-3,6-di(o-methoxyphenyl)pyrrolo[3,4-c]pyrrole is heterogeneous/uneven on the emission area of the device. According to EP' 011 only highly crystalline organic pigments should be employed for a light emitting material (see page 7 line 2 to 7). However, one of the requirements for light emitting materials is its morphological stability. Crystalline materials show a tendency to be morphologically modulated in the evaporated film. This becomes a disadvantage for ensuring device durability (cf. enclosed Comparative Example 1).

The Examiner rejects claims 1, 2 and 4-7 under 35 U.S.C. 103 as being unpatentable over EP '011 and Jost. The Examiner asserts, in essence, that it would have been obvious to use the compounds taught in Jost in the electroluminescent devices taught in EP '011. Applicants respectfully traverse this rejection.

Jost does not teach the use of DPP compounds in EL devices. Also, 2,5-dimethyl-3,6-di(p-methylphenyl)pyrrolo[3,4-c]pyrrole mentioned in Example 6 of Jost does not show electroluminescence in thin film type organic EL devices. Thus, it would not have been obvious to use the compounds taught in Jost in the electroluminescent devices of the present application.

Applicants submit that the instant application is now in condition for allowance. In the event that minor amendments will further prosecution, Applicants request that the Examiner contact the undersigned representative.

Respectfully submitted,

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Amended Claims with underlining and bracketing

Claims

1. (amended) Electroluminescent device comprising in this order

(a) an anode

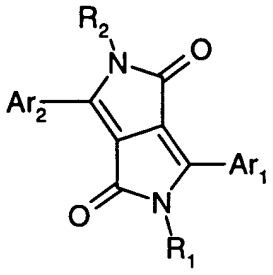
(b) a hole transporting layer

(c) a light-emitting layer

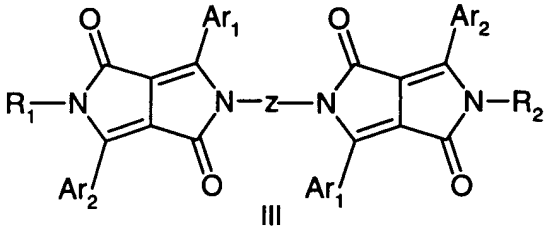
(d) optionally an electron transporting layer and

(e) a cathode

and a light-emitting substance, wherein the light-emitting substance is a diketopyrrolopyrrole ("DPP") represented by formula I or formula III



I

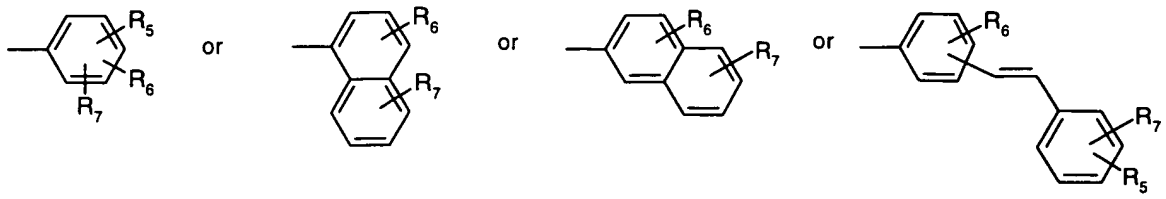


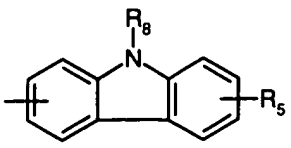
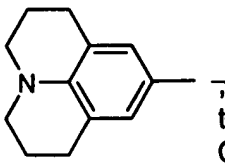
III

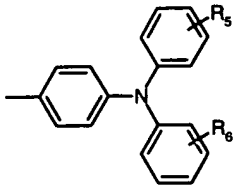
wherein R_1 and R_2, independently from each other, stand for C_1-C_{25}-alkyl, allyl which can be substituted one to three times with C_1-C_3alkyl or Ar_3, or -CR_3R_4-$(CH_2)_m$-Ar_3, wherein R_3 and R_4 independently from each other stand for hydrogen, ~~or~~ C_1-C_4alkyl, or phenyl which can be substituted one to three times with C_1-C_3 alkyl,

Ar_3 stands for phenyl or 1- or 2-naphthyl which can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, halogen or phenyl, which can be substituted with C_1-C_8alkyl or C_1-C_8alkoxy one to three times, and m stands for 0, 1, 2, 3 or 4,

Ar_1 and Ar_2, independently from each other, stand for ~~aryl radicals, preferably for~~



or  or julodidyl,  ~~, which can be substituted one to four times with C_1-C_4alkyl, C_1-C_4alkoxy, or phenyl~~

or 

wherein

R_5, R_6 and R_7, independently from each other, stand for hydrogen, cyano, halogen, C_1-C_6alkyl, -NR_8R_9, -OR_{10}, -$S(O)_nR_8$, -$Se(O)_nR_8$, or phenyl, which can be substituted one to three times with C_1-C_8alkyl or C_1-C_8alkoxy,

wherein R_8 and R_9, independently from each other, stand for hydrogen, phenyl, C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, -CR_3R_4-$(CH_2)_m$-Ph, R_{10}, wherein R_{10} stands for C_6-C_{24}-aryl, or a saturated or unsaturated heterocyclic radical comprising five to seven ring atoms, wherein the ring consists of carbon atoms and one to three hetero atoms selected from the group consisting of nitrogen, oxygen and sulfur, wherein Ph, the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, or halogen, or

R_8 and R_9 stand for -$C(O)$~~R_{10}~~R_{11}, wherein R_{11} can be C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, R_{10}, -OR_{12} or -$NR_{13}R_{14}$, wherein R_{12}, R_{13}, and R_{14} stand for C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, C_6-C_{24}-aryl,

or

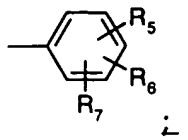
R_5, R_6 and R_7, independently of one another, stand for a saturated or unsaturated heterocyclic radical comprising five to seven ring

atoms, wherein the ring consists of carbon atoms and one to three hetero atoms selected from the group consisting of nitrogen, oxygen and sulfur, wherein the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl or C_1-C_8alkoxy,

or -NR_8R_9 stands for a five- or six-membered heterocyclic radical in which R_8 and R_9 together stand for tetramethylene, pentamethylene, -CH_2-CH_2-O-CH_2-CH_2-, or -CH_2-CH_2-NR_5-CH_2-CH_2-, ~~preferably -CH_2-CH_2-O-CH_2-CH_2-,~~ and n stands for 0, 1, 2 or 3,

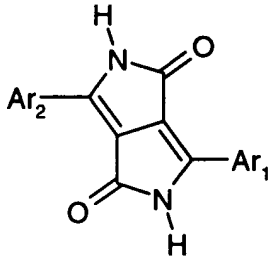
and wherein Z stands for a diradical selected from the group consisting of a single bond, C_2-C_6alkylene, which can be substituted one to three times with C_1-C_4alkyl, C_1-C_4alkoxy, or phenyl, phenylene or naphthylene,

with the proviso that R_6 and R_7 do not stand simultaneously for hydrogen if Ar_1 and Ar_2 stand for

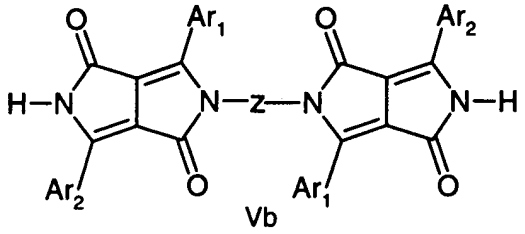


with the proviso that 2,5-dimethyl-3,6-di(p-methylphenyl)pyrrole[3,4-c]pyrrole is excluded.

2. (amended) Process for the preparation of compounds I or III according to claim ~~1~~ 7 in treating in a first step the DPP derivative of formula Va or formula Vb



(Va)

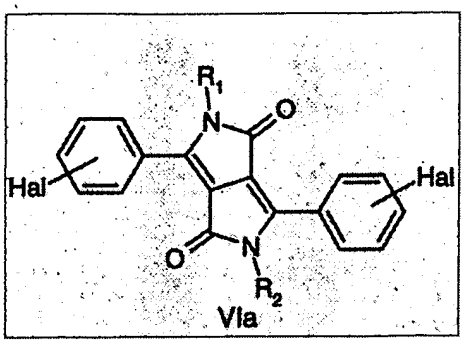


Vb

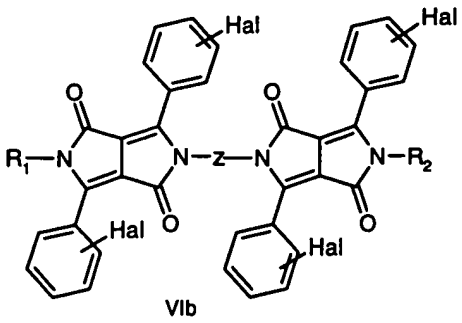
wherein Ar_1 and Ar_2 are~~-~~, independently from each other, aryl radicals~~defined as in claim 1~~, with a base, then, in a second step, treating the reaction mixture obtained in the first step with an usual alkylating agent, wherein in the first step the base is a hydride, an alkali metal alkoxide or a carbonate, and the alkylating agent is a sulfonate, tosylate, mesylate, carbonate, sulfate, or halogen compound of the formula $(R_1)_{1 \text{ or } 2}X$, wherein X stands for SO_3-, (p-Me-phenyl)~~SO~~$_2SO_3$-, (2,4,6-trimethyl-phenyl)-~~SO~~$_2SO_3$-, -CO_3-, -SO_4-, or halogen, or a mixture of $(R_1)_{1 \text{ or } 2}X$ and $(R_2)_{1 \text{ or } 2}X$.

3. (amended) Process for the preparation of compounds I according to claim ~~1~~ 7

~~(a) in treating~~comprising (a) treating in a first step the DPP derivative of formula VIa or formula VIb

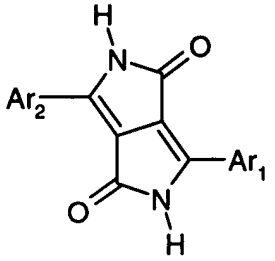


Vla

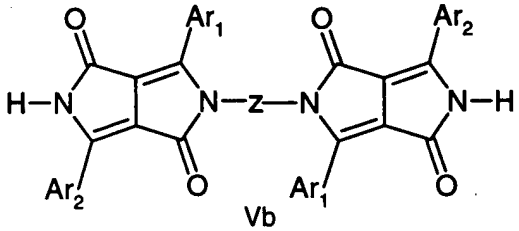


Vlb

wherein R_1 and R_2 are independently from each other, hydrogen, C_1-C_{25}-alkyl, allyl which can be substituted one to three times with C_1-C_3alkyl or Ar_3, or -CR_3R_4-$(CH_2)_m$-Ar_3, wherein R_3 and R_4 independently from each other stand for hydrogen, C_1-C_4alkyl, or phenyl which can be substituted one to three times with C_1-C_3 alkyl~~defined as in claim 1~~, Hal stands for halogen, with a nucleophilic agent ~~such as~~selected from a secondary amine, HNR_8R_9, a thiol, HSR_8, ~~or~~ $HS(O)_nR_8$, an alcohol, HOR_{10}, a diselenide, or $R_8(O)_nSe$-$Se(O)_nR_8$, ~~preferably~~ in a molar ratio of DPP Vla or Vlb:nucleophilic agent in the range of 1.2:1 to 0.8:1, or, if R_2 has the same meaning as R_1 in the range of from 1:2.5 to 1:1, in the presence of an anhydrous dipolar aprotic solvent, and of an anhydrous base in an amount in the range of from ~~usually~~ 0.1 to 15 moles per mole of the nucleophilic agent, at a temperature in the range of from ~~usually~~ 100 to 220°C and under a pressure generally in the range of from 100 to 300 kPa, and optionally isolating the obtained compound



(Va)



Vb

~~Va, resp. Vb~~,

(b) then treating the obtained compound Va~~, resp.~~or Vb, wherein Ar_1 and Ar_2 are, independently from each other, aryl radicals, ~~(as defined in claim 2)~~, with a base, thereafter in a second step, treating the reaction mixture obtained in the first step of (b) with an ~~usual~~ alkylating agent, wherein in the first step of (b) the base is a hydride, an alkali metal alkoxide or a carbonate, and the alkylating agent is a sulfonate, tosylate, mesylate, carbonate, sulfate, or

halogen compound of the formula $(R_1)_{1 or 2}X$, wherein X stands for SO_3-, (p-Me-phenyl)-~~SO~~$_2SO_3$-, (2,4,6-trimethyl-phenyl)~~SO~~$_2SO_3$-, $-CO_3$-, $-SO_4$-, or halogen, or a mixture of $(R_1)_{1 or 2}X$ and $(R_2)_{1 or 2}X$.

4. (amended) Method of coloring high molecular weight organic materials by incorporating at least one ~~the~~ DPP compounds I or III according to claim ~~1~~ 7 into said materials ~~in analogy to known methods in the art~~.

5. (amended) ~~Composition~~ Colored high molecular weight organic material comprising

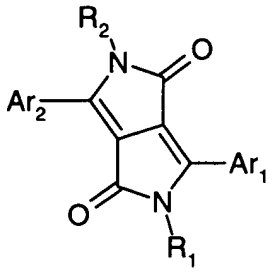
(a) 0.01 to 50% by weight, based on the total weight of the colored high molecular weight organic material, of a fluorescent DPP I or III according to claim ~~1~~7, and

(b) 99.99 to 50% by weight, based on the total weight of the colored high molecular weight organic material, of a high molecular organic material, and

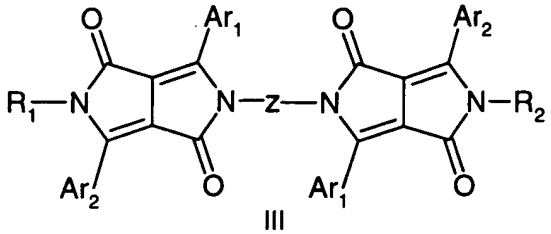
(c) if desired, customary additives in effective amounts.

6. (amended) Composition according to claim ~~6~~5, wherein the high molecular weight organic material is a polyamide, a polystyrene, ~~preferably high impact polystyrene~~, polymethylmethacrylate or an ABS copolymer.

7. (amended) Fluorescent diketopyrrolopyrroles represented by formula I or formula III



I

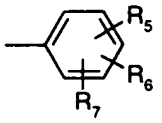
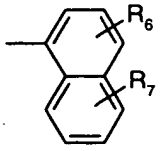
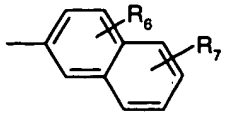


III

wherein R_1 and R_2, independently from each other, stand for C_1-C_{25}-alkyl, allyl which can be substituted one to three times with C_1-C_3alkyl or Ar_3, or $-CR_3R_4-(CH_2)_m-Ar_3$, wherein R_3 and R_4 independently from each other stand for hydrogen or C_1-C_4alkyl, or phenyl which can be substituted one to three times with C_1-C_3 alkyl,

Ar_3 stands for phenyl or 1- or 2-naphthyl which can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, halogen or phenyl, which can be substituted with C_1-C_8alkyl or C_1-C_8alkoxy one to three times, and m stands for 0, 1, 2, 3 or 4,

Ar_1 and Ar_2, independently from each other, stand for ~~aryl radicals, preferably for~~


or

or

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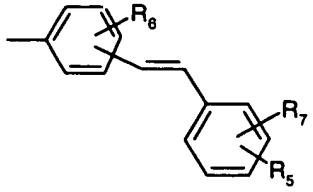

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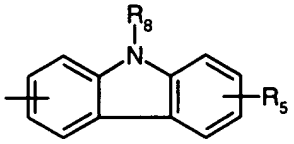
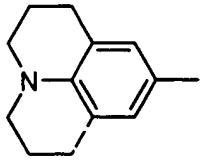
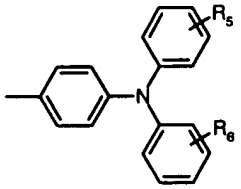

or julodidyl,

, ~~which can be substituted one to four times~~ with C_1-C_4alkyl, C_1-C_4alkoxy, or phenyl

or


wherein

R_5, R_6 and R_7, independently from each other, stand for hydrogen, cyano, halogen, C_1-C_6alkyl, -NR_8R_9, -OR_{10}, -$S(O)_nR_8$, -$Se(O)_nR_8$, or phenyl, which can be substituted one to three times with C_1-C_8alkyl or C_1-C_8alkoxy,

wherein R_8 and R_9, independently from each other, stand for hydrogen, phenyl, C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, -CR_3R_4-$(CH_2)_m$-Ph, R_{10}, wherein R_{10} stands for C_6-C_{24}-aryl, or a saturated or unsaturated heterocyclic radical comprising five to seven ring atoms, wherein the ring consists of carbon atoms and one to three hetero atoms selected from the group consisting of nitrogen, oxygen and sulfur, wherein Ph, the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, or halogen, or

R_8 and R_9 stand for -$C(O)R_{10}R_{11}$, wherein R_{11} can be C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, R_{10}, -OR_{12} or -$NR_{13}R_{14}$, wherein R_{12}, R_{13}, and R_{14} stand for C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, C_6-C_{24}-aryl,

or

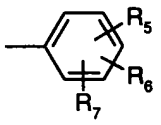
R_5, R_6 and R_7, independently of one another, stand for a saturated or unsaturated heterocyclic radical comprising five to seven ring atoms, wherein the ring consists of carbon atoms and one to three hetero atoms selected from the group consisting of nitrogen, oxygen and sulfur, wherein the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl or C_1-C_8alkoxy, or $-NR_8R_9$ stands for a five- or sixmembered heterocyclic radical in which R_8 and R_9 together stand for tetramethylene, pentamethylene, $-CH_2-CH_2-O-CH_2-CH_2-$, or $-CH_2-CH_2-NR_5-CH_2-CH_2-$, ~~preferably $-CH_2-CH_2-O-CH_2-CH_2-$~~, and n stands for 0, 1, 2 or 3, and wherein Z stands for a diradical selected from the group consisting of a single bond, C_2-C_6alkylene, which can be substituted one to three times with C_1-C_4alkyl, C_1-C_4alkoxy, or phenyl, phenylene or naphthylene, with the proviso that R_6 and R_7 do not stand simultaneously for hydrogen; or

$R_1 = R_2 = C_1$-C_8alkyl, $Ar_1 = Ar_2$ = phenyl, $R_7 = -NR_8R_9$ in 4-position, $R_5 = R_6$ = hydrogen, and $R_8 = R_9$ = C_1-C_8alkyl or phenyl;

$R_1 = R_2 = C_1$-C_8alkyl, $-(CH_2)_m$-Ph, $Ar_1 = Ar_2$ = phenyl, $R_5 = R_6$ = hydrogen, $R_7 = -OR_{10}$, $-N(R_8)_2$ or unsubstituted or substituted phenyl in para-position, and $R_8 = C_1$-C_8alkyl, phenyl or a heterocyclic radical, both unsubstituted or substituted, or C_5-C_{12}-cycloalkyl; or

$R_1 = R_2 = -CH_2$-Ph, wherein phenyl can be substituted with phenyl, naphthyl or C_1-C_4alkyl up to two times, $Ar_1 = Ar_2$ = phenyl, $R_5 = R_6$ = hydrogen, $R_7 = C_1$-C_8alkyl or phenyl.

10. (amended) Fluorescent diketopyrrolopyrroles of the formula (A2), (A3) or (A4) according to claim 8, where Ar_1 and Ar_2, independently from each other, stand for



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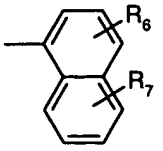

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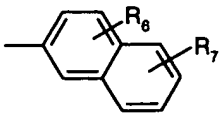

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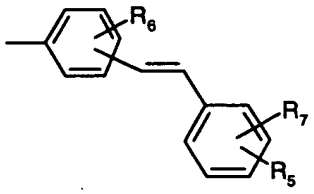

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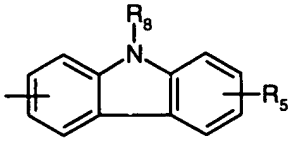
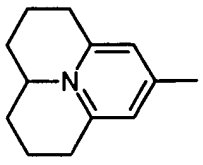
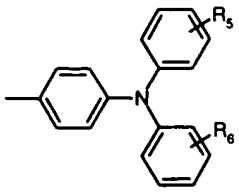


or julodidyl,


, which can be substituted one to four times with C_1-C_4alkyl, C_1-C_4alkoxy, or phenyl



wherein

R_5, R_6 and R_7, independently from each other, stand for hydrogen, cyano, halogen, C_1-C_6alkyl, -NR_8R_9, -OR_{10}, -$S(O)_nR_8$, -$Se(O)_nR_8$, or phenyl, which can be substituted one to three times with C_1-C_8alkyl or C_1-C_8alkoxy,

wherein R_8 and R_9, independently from each other, stand for hydrogen, phenyl, C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, -CR_3R_4-$(CH_2)_m$-Ph, R_{10}, wherein R_{10} stands for C_6-C_{24}-aryl, or a saturated or unsaturated heterocyclic radical comprising five to seven ring atoms, wherein the ring consists of carbon atoms and one to three hetero atoms selected from the group consisting of nitrogen, oxygen and sulfur, wherein Ph, the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl, C_1-C_8alkoxy, or halogen, or

R_8 and R_9 stand for -$C(O)R_{10}$, wherein R_{11} can be C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, R_{10}, -R_{12} or -$NR_{13}R_{14}$, wherein R_{12}, R_{13}, and R_{14} stand for C_1-C_{25}-alkyl, C_5-C_{12}-cycloalkyl, C_6-C_{24}-aryl, or a saturated or unsaturated heterocyclic radical comprising five to seven ring atoms, wherein the ring consists of carbon atoms and one to three hetero atoms selected from the group consisting of nitrogen, oxygen and sulfur, wherein the aryl and heterocyclic radical can be substituted one to three times with C_1-C_8alkyl or C_1-C_8alkoxy,

or -NR_8R_9 stands for a five- or six-membered heterocyclic radical in which R_8 and R_9 together stand for tetramethylene, pentamethylene, -CH_2-CH_2-O-CH_2-CH_2-, or -CH_2-CH_2-NR_5-CH_2-CH_2-, and n stands for 0, 1, 2 or 3.

12. (new) An electroluminescent device wherein R_8 and R_9 together stand for -CH_2-CH_2-O-CH_2-CH_2-.

13. (new) A compound according to the formulae